FERGUSON, DENZEL E. 1963. *Ambystoma macrodactylum*, p. 4. *In* W. J. Riemer (ed.), Catalogue of American Amphibians and Reptiles. American Society of Ichthyologists and Herpetologists, Bethesda, Maryland.

Ambystoma macrodactylum Baird
Long-toed salamander

Ambystoma macrodactyla Baird, 1849:292. Type-locality, "Astoria, [Clatsop County], Oregon." Syntype, U.S. Natl. Mus. 4042, collected by J. K. Townsend, [? 1836]. This is apparently the sole survivor of the original syntypic series.

• CONTENT. Five subspecies are recognized: *A. m. macrodactylum*, *A. m. columbianum*, *A. m. krausei*, *A. m. sigillatum*, and *A. m. croceum.* For a key to subspecies, see Ferguson (1961:331-332).

• DEFINITION. A slender *Ambystoma* of western North America, with a yellow, greenish yellow, tan, or dull orange middorsal stripe extending onto the tail; a dark ground color; a maximum total length of 170 mm in life, 155 mm preserved. Larvae are of the pond type and have 9-13 gill rakers on the anterior face of the third arch; general coloration is light olive gray to brownish gray mottled with brown or black; the venter is dirty white.

• DESCRIPTIONS. Adults are described by Bishop (1947:141-143), Stebbins (1951:36-37), Russell & Anderson (1956:137-139), and Ferguson (1961:313-322); larvae by Bishop (1947:143), Stebbins (1951:39, 438), Kezer & Farner (1955:128-130), and Ferguson (1961: 333-334); eggs by Slater (1936:235), Stebbins (1951: 39), Anderson (MS), Knudsen (1960:44-46), and Ferguson (1961:333); and spermatophore by Anderson (1961:137-138).

• ILLUSTRATIONS. For photographs of adults see Bishop (1947:141), Russell & Anderson (1956:138), and Ferguson (1961:314, 316, 319, 321); Stebbins (1951) illustrates larvae (p. 447) and eggs (p. 431); and Anderson (MS) illustrates eggs, and (1961:137) the spermatophore.

• DISTRIBUTION. The species is known from Tuolumne County, California, northward in the Sierra Nevada, throughout Oregon (except the extreme southeastern corner), Washington, and British Columbia, north to southeastern Alaska. It is also present in western Alberta and Montana, central and northern Idaho, and a disjunct population occurs in Santa Cruz County, California. Mus. Vertebr. Zool. 7284 from the town of Telegraph Creek, British Columbia, Canada, is the only known specimen from north of Vancouver Island.

The species occurs from sea level to 9000 feet elevation, inhabiting sagebrush semidesert and all intermediate vegetation types up to alpine meadows. See Ferguson (1961) for actual localities, discussion of habitat, and range of elevation.

The species is erroneously reported from Davis County, Iowa (Ruthven, 1912).

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. Ferguson (1961) provides the most comprehensive monograph of the species. Other valuable papers are those of Anderson (1961, courtship); Storm & Pimentel (1954, breeding populations); Schonberger (1945), Farner (1947), and Anderson (MS) food habits; and Anderson (MS) ecology.

• REMARKS. On the basis of courtship (Anderson, 1961) and osteology (Tihen, 1958), *Ambystoma macrodactylum* is considered most closely related to the Jeffersonianum-Laterale complex of the eastern United States.

Neoteny is not known to occur.

• ETYMOLOGY. The name *macrodactylum* comes from the Greek *makros*, "long" or "large," and *daktylos*, "toe." Derivations of the subspecific names are as follows: *columbianum* alludes to a distribution in the Columbia River drainage basin; *croceum* is from Latin *croceus*, meaning saffron-colored; *krausei* is a patronym possibly referring to Karl C. F. Krause, a German writer and philosopher; and *sigillatum* is from Latin *sigillatus*, adorned with images or figures.

Common names for subspecies are those suggested by Ferguson (1961).

1. *Ambystoma macrodactylum macrodactylum* Baird
Western long-toed salamander

Ambystoma macrodactyla Baird. See species account.
Ambystoma macrodactylum macrodactylum: Mittleman, 1948:82.

• DEFINITION. Pigment of the dorsal stripe on the head, snout, and eyelids consists of diffuse flecks; the dorsal stripe is dull in color on the body or nearly absent; white flecks on the lateral body surfaces are numerous and nearly coalesce; the combined vomerine tooth count is less than 34; the head is short and narrow; the lens is small.

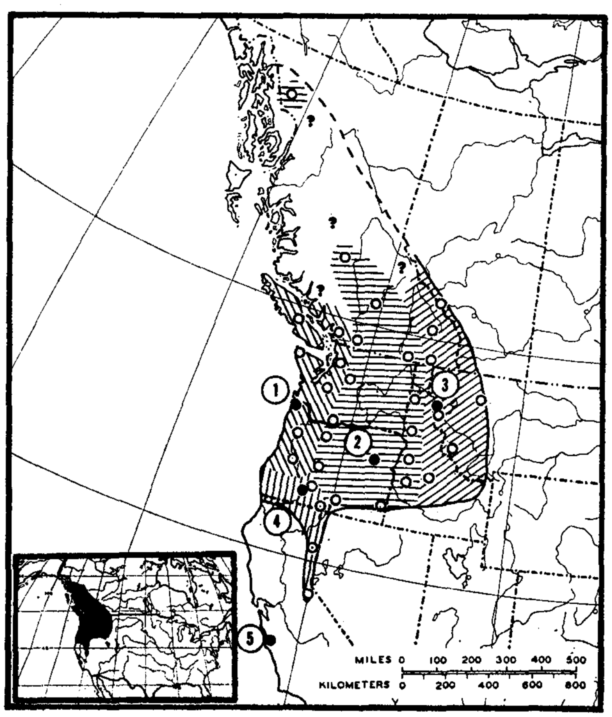
• REMARKS. Intergrades with *A. m. columbianum* occur where the Columbia River of Washington and Oregon, and the Fraser River of British Columbia cut through the Cascade Mountains. See Ferguson (1961: 321) for a photograph of the adult.

2. *Ambystoma macrodactylum columbianum* Ferguson
Eastern long-toed salamander

Ambystoma macrodactylum columbianum Ferguson, 1961:313. Type-locality, "0.5 mile N. Anthony Lakes (SW ¼, Sec. 7, R37E, T7S), Union Co., Oregon, (Elev. 7100 feet)." Holotype, U.S. Natl. Mus. 142228, collected by Oliver W. Johnson and Denzel E. Ferguson, 3 August 1956.

• DEFINITION. The dorsal stripe is uninterrupted on the body, but forms large distinct spots on the head; the dorsal stripe width exceeds the internarial distance; the combined vomerine tooth count exceeds 33.

• REMARKS. Intergrades with *A. m. sigillatum* occur in Klamath and Lake Counties, Oregon; with *A. m. macrodactylum* as noted above; with *A. m. krausei* along a broad zone from Valley and Idaho Counties, Idaho, north along a line parallel to the Bitterroot and Selkirk Ranges, through western British Columbia. A single poorly preserved specimen from Telegraph Creek,



MAP. Solid circles mark type-localities. Hollow circles are other selected localities. Question marks indicate unknown distributional boundaries. After Goode Base Map 202, © University of Chicago 1937.

British Columbia, most nearly resembles *A. m. columbianum.*

See Bishop (1947:141) and Ferguson (1961:314) for photographs of adults.

3. *Ambystoma macrodactylum krausei* Peters Northern long-toed salamander

Amblystoma krausei Peters 1882:145. Type-locality, "Flathead River, Montana." Holotype not known to exist, collector unknown.

Ambystoma macrodactylum krausei: Mittleman, 1948: 82.

Amblystoma epixanthum Cope, 1883:16. Type-locality, "South [Fork of] Boise River, [Atlanta, Elmore County], Idaho." Syntypes, Acad. Nat. Sci. Philadelphia 13880-81, 13883, collected by E. D. Cope, 1882.

Ambystoma stejnegeri Ruthven, 1912:517. Type-locality, "Bloomfield, Davis County, Iowa" [in error]. Holotype, U. S. Natl. Mus. 48598, collected by G. H. Berry, 27 July 1906.

• DEFINITION. The dorsal stripe is continuous onto the snout, and widest between or just posterior to the eyes; the edges of the stripe are nearly parallel; a large patch of stripe pigment is present on each eyelid; the combined vomerine tooth count is less than 34.

• REMARKS. Intergradation with *A. m. columbianum* is discussed under that subspecies. See Ferguson (1961:319) for a photograph of the adult.

Cope (1889:96) used the name *Amblystoma kraussii.* As a subsequent misspelling it has no nomenclatural standing.

4. *Ambystoma macrodactylum sigillatum* Ferguson Southern long-toed salamander

Ambystoma macrodactylum sigillatum Ferguson, 1961: 316. Type-locality, "100 yards W. of the boat landing in Eagle Cove of Crater Lake, Klamath Co., Oregon, (Elev. 6170 feet)." Holotype, U.S. Natl. Mus. 142212, collected by Oliver W. Johnson and Denzel E. Ferguson, 28 July 1956.

• DEFINITION. The dorsal stripe is yellow, usually interrupted on the body by forming well-defined spots or configurations; the maximum stripe width on the body is less than the internarial distance; the combined vomerine tooth count exceeds 33.

• REMARKS. Intergrades with *A. m. columbianum* occur in Lake and Klamath Counties, Oregon; this subspecies is apparently allopatric with *A. m. macrodactylum.* The dorsal stripe of the Sierra Nevada populations in California is wide with deeply undulated edges, or it is interrupted (see illustration in Stebbins, 1951:161).

See Ferguson (1961:316) for a photograph of the adult.

5. *Ambystoma macrodactylum croceum* Russell & Anderson Santa Cruz long-toed salamander

Ambystoma macrodactylum croceum Russell & Anderson, 1956:137. Type-locality, "Rio Del Mar, Santa Cruz County, California." Holotype, Mus. Vertebr. Zool. 63734, collected by James D. Anderson and R. W. Russell, 2 December 1954.

• DEFINITION. The dorsal stripe is dull orange, interrupted, and reduced on the head; the ground color is black.

• REMARKS. The range is disjunct from that of the other races; this subspecies is known only from Santa Cruz County, California. Since the type-locality is now part of a housing subdivision, and another is slated to be built at the only other major collecting site, the subspecies faces possible extinction.

Affinities are apparently with *A. m. sigillatum* of southwestern Oregon. See Russell & Anderson (1956: 138) for a photograph of the adult.

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Issued 31 December 1963. Publication is supported by National Science Foundation grant G24231.